29689-1

PATENT APPLICATION

TITLE: SHOE LACING

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"Express Mail" mailing number
EV 263 454 207 US
Date of Deposit March 3, 2004

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CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a Continuation-in-Part application claiming priority under 35 U.S.C. 120 to U.S. Application No. 10/383,403, filed March 7, 2003, the entirety of which is incorporated by reference.

BACKGROUND

This invention relates to shoes, and more particularly to lacing systems for shoes. Shoe laces have been used for many years, laced through a plurality of eyelets on opposing sides of an expansion opening, for the purpose of drawing shoes tightly about the foot of a wearer. However, the process of tightening and tying the lacing elements on shoes requires a threshold level of knowledge, as well as threshold level of physical dexterity and physical strength.

While the required threshold levels of knowledge, dexterity, and strength are not especially high, such requirements do present difficulties for those who are physically challenged such as young children, the physically handicapped and some elderly, and for those who are mentally challenged such as the mentally handicapped and young children. Some users may be both physically challenged and mentally challenged.

While a number of alternative structures have been used, and are being used, in place of lacings, large numbers of shoes are still made with lacing eyelets, and lacings.

There are now available a variety of structures of eyelets, made from a variety of materials. There are available a number of arrangements of eyelets about the expansion opening. Lacings can be obtained in a variety of structures and materials. Lacings can be fixed length, or resiliently expansible.

In light of the ongoing consumer acceptance of lacings as closure devices for shoes, there is a need for improvements in use of lacings which facilitate use of lacings by those who are mentally or physically challenged, or both, with respect to use of lacings.

Thus, there is a need for an invention which provides a lacing kit which includes at least one lacing, defining first and second lacing elements, and a clasp, wherein the lacing elements are passed through the clasp, with the clasp accommodating facile passing of the lacing elements for tightening the lacing elements on the shoe, and subsequently holding the lacing elements tight on the shoe until release of the tightening is desired.

There is also a need for such lacing kit wherein apertures on the clasp operate as gripping structure, gripping and holding the lacing elements.

There is also a need for gripping structure which operates as a mechanical closure on the clasp, optionally in combination with closing and opening of a cover on the clasp, and wherein a cover engages and disengages a receptacle, with engagement of the cover on the receptacle operating to fix the position of a lacing in the clasp.

There is still further a need for a clasp which has a receptacle, and a cover which is separate and distinct from the receptacle, and which is separable from the receptacle for alternating closing of the clasp, and opening of the clasp for access to the receptacle.

There is also a need for lacing exit apertures on opposing sides of the clasp, optionally to provide clasp structure wherein the lacing elements pass through the clasp along first and second different paths, optionally wherein the paths are mirror-image paths.

Yet another need is for a mechanical holding device adapted for attachment to at least one of the lacing elements, for blocking passage of the respective lacing element through an eyelet of the shoe.

Still other need is for shoes having lacing structures of the invention installed thereon, wherein each of the lacing elements are anchored to the shoe body, and the lacing elements pass through the clasp to define lacing loops emergent from the clasp.

Still another need is for methods of handling lacing operations on a shoe by anchoring lacing ends to the shoe body, passing lacing loops through a clasp, and tightening the lacing elements, with the clasp holding the lacing elements tight until such time as release of the lacing elements is desired.

Yet another need is for methods of handling lacing operations on a shoe wherein pulling first and second lacing loops away from each other operates to draw a clasp, which is engaged with the lacing loops, against the shoe body while drawing the left and right sides of the shoe body toward each other, tightening the lacing elements on the shoe, and tightening the shoe about the foot of the wearer.

There is yet another need for such method wherein a cover on the clasp can be manipulated with respect to a receptacle on the clasp, while the lacing is thus holding the shoe body firmly on the foot of the wearer, thereby to temporarily fix the position of the lacing with respect to the clasp.

There is a further need to release the temporary fixation of the lacing with respect to the clasp by manipulating, e.g. lifting, the cover with respect to the receptacle.

SUMMARY

First and second shoe lacing elements are threaded through eyelets of the shoe at or adjacent the distal end of the expansion opening on the shoe, and an end of each lacing element is anchored to the shoe body. Each lacing element defines a lacing loop on the exterior of the shoe body. The so-defined lacing loops are threaded through a clasp. Pulling the loops, which exit the clasp, in different directions, preferably away from each other, draws the clasp toward the shoe body, and tightens the lacing elements on the shoe body. In some embodiments, gripping elements of the clasp automatically grip the lacing elements. In other embodiments, the lacing elements are brought into gripping engagement with the gripping elements through a separate operation. When the tightening force is released, with the gripping elements engaged, the gripping elements on the clasp grip the lacing elements and hold the lacing elements in the tightened position relative to the shoe body. Releasing the gripping elements on the clasp releases the lacing elements from their tightened positions relative to the shoe body, such that the lacing elements can be loosened on the shoe.

In a first family of embodiments, the invention comprehends a method of tightening lacing on a shoe body, and about a foot, of a wearer, in the shoe body. First and second lacing elements are laced through respective first and second eyelets on first and second opposing sides of an expansion opening of the shoe body. Portions of the first and second lacing elements can be pulled through the respective first and second eyelets. Each of the lacing elements passes through clasp structure, wherein a manual gripping feature is removably assembled to a clasp body, along first and second separate and distinct different paths, between the respective ones of the first and second eyelets and respective first and second ends of the respective lacing elements. The method comprises pulling on the lacing elements and thereby drawing portions of the lacing elements through the respective eyelets, and correspondingly through the clasp structure and tightening the shoe body about the foot of the wearer; and while holding the lacing elements pulled in tightened relationship on the shoe body and about the foot of the wearer, applying a manual force to the manual gripping feature of the clasp structure which is removably assembled to the clasp body, and thereby engaging the clasp structure with the first and second lacing elements so as to temporarily grip and retain the shoe body in a tightened condition about the foot of the wearer.

In some embodiments, the pulling of the lacing elements comprises holding the first lacing element in the tightened condition while applying manual force to a second manual gripping feature of the clasp structure, and holding the second lacing element in the tightened condition while applying manual force to a second gripping feature of the clasp structure.

In some embodiments, the clasp structure comprises first and second clasps, having respective first and second manual gripping features, and the first lacing element passes through and is engaged by the first clasp, and the first lacing element passes through and is engaged by, the second clasp, and the first and second clasps, when so engaged, are disposed adjacent the respective ones of the first and second eyelets.

In some embodiments, the respective first and second lacing elements comprise respective first and second lacing loops, adjacent the respective first and second eyelets, the first and second lacing loops being threaded through the clasp structure, and the pulling on the lacing elements comprises pulling on the lacing loops to thereby tighten the shoe body about the foot of the wearer.

In some embodiments, the method further comprises pulling the first and second lacing loops in first and second different directions generally away from each other.

In some embodiments, the pulling of the first and second lacing loops in the first and second different directions comprises pulling the respective lacing loops from the clasp in directions toward the left and right sides of the shoe body.

In some embodiments the method includes threading the first and second loops into the clasp body through a centrally-disposed receiving aperture.

In some embodiments, the method further comprises releasing the clasp structure from the lacing loops and traversing the lacing loops backward through the clasp structure so as to establish the first and second lacing loops in loose arrangement, whereby the loose arrangement enables drawing the left and right sides of the shoe body away from each other at the expansion opening thereby to enable expanding the expansion opening.

In some embodiments, the method further comprises, to establish the first and second lacing loops, threading the first and second lacing elements each outwardly away from the shoe body through a next adjacent eyelet and then inwardly through a terminal eyelet.

In some embodiments, the method further comprises anchoring at least one of the first and second lacing elements to the shoe body at a location on the respective lacing element which is between a lacing end on the respective lacing element and a portion of

the lacing element which is adjacent one of a terminal eyelet and a respective next adjacent eyelet.

In some embodiments, the method further comprises anchoring at least one of the first and second lacing elements to the shoe body.

In some embodiments, the manual gripping feature is embodied on a cover of the clasp structure, which engages the clasp body, and moving the cover away from the clasp body effectively releases the lacing elements from the gripping feature.

In some embodiments, the clasp structure comprises a clasp body and a clasp cover, and the tightening of the lacing elements on the shoe body comprises engaging latch structure on one of the clasp cover and the clasp body with the other of the clasp cover and the clasp body, and subsequently pulling the loops in generally opposing directions.

In some embodiments, the clasp structure comprises a clasp cover, and the engaging of the clasp structure with the first and second lacing elements comprises pinching the lacing elements between the clasp body and the clasp cover.

In a second family of embodiments, the invention comprehends a method of tightening lacing on a shoe body of a shoe wherein first and second lacing elements are laced through eyelets on opposing first and second sides of an expansion opening of the shoe body, and through clasp structure, thereby defining first and second loosely extending lacing loops extending from the clasp structure. The method comprises grasping the first and second loosely extending lacing loops and pulling the first and second lacing loops in directions generally away from each other and thereby increasing the lengths of the lacing loops, the drawing of the first and second lacing loops relatively away from each other operating to draw the clasp structure against the shoe body and to draw the sides of the shoe body against a foot of a wearer of such shoe. The method further comprises engaging portions of the first and second lacing elements with respective gripping structure at the clasp structure so as to temporarily retain the lacing elements in a tightened configuration, thereby to retain the sides of the shoe body against the foot of the wearer.

In some embodiments, the first lacing loop extends from the first side of the expansion opening and communicates with a first eyelet on the first side of the expansion opening, and the second lacing loop extends from the second side of the expansion opening and communicates with a second eyelet on the second side of the expansion opening.

In some embodiments, the pulling of the lacing loops comprises holding the first lacing loop in the tightened condition while engaging a first gripping structure of the clasp structure, and holding the second lacing element in the tightened condition while engaging a second gripping structure of the clasp structure.

In some embodiments, the clasp structure comprises first and second clasps, having respective first and second gripping structure, the first lacing element passes through and is engaged by the first clasp, the second lacing element passes through and is engaged by the second clasp, and the first and second clasps, when so engaged, are disposed adjacent the respective ones of the first and second eyelets.

In some embodiments, the pulling of the first and second lacing loops in the first and second different directions comprises pulling the respective lacing loops from the clasp structure in directions toward left and right sides of the shoe body.

In some embodiments, the method includes threading the first and second lacing loops into the clasp body through a centrally-disposed receiving aperture.

In some embodiments, the method further comprises releasing the clasp structure from the lacing loops and traversing the lacing loops backward through the clasp structure so as to establish the first and second lacing loops in loose arrangement, whereby the loose arrangement enables drawing the left and right sides of the shoe body away from each other at the expansion opening thereby to enable expanding the expansion opening.

In some embodiments, the method further comprises, to establish the first and second lacing loops, threading the first and second lacing elements each outwardly away from the shoe body through a next adjacent eyelet and then inwardly through a terminal eyelet.

In some embodiments, the method further comprises anchoring at least one of the first and second lacing elements to the shoe body at a location on the respective lacing element which is between a lacing end on the respective lacing element and a portion of the lacing element which is adjacent one of a terminal eyelet and a respective next adjacent eyelet.

In some embodiments, the method further comprises anchoring at least one of the first and second lacing elements to the shoe body.

In some embodiments, the gripping structure is embodied on a cover of the clasp structure which engages the clasp body, and moving the cover away from the clasp body effectively releases the lacing elements from the gripping structure.

In some embodiments, the clasp structure comprises a clasp body, for example a clasp receptacle, and a clasp cover, and the tightening of the lacing elements on the shoe

body comprises engaging latch structure on one of the clasp cover and the clasp body with the other of the clasp cover and the clasp body, and subsequently pulling the loops in generally opposing directions.

In some embodiments, the clasp structure comprises a clasp cover, and the engaging of the gripping structure with the first and second lacing elements comprises pinching the lacing elements between the clasp body and the clasp cover.

In a third family of embodiments, the invention comprehends a method of handling lacing operations on a shoe, the shoe having a shoe body, a left side, a right side, an aperture for inserting a wearer's foot therethrough for putting the shoe on and taking the shoe off, an expansion opening having a distal end in communication with the aperture, and a proximal end remote from the aperture, left and right sides of the expansion opening being defined by left and right edges of respective left and right upper sides of the shoe body. First and second arrays of eyelets are disposed respectively along upper portions of each of the left and right sides of the shoe body, adjacent the left and right edges of the expansion opening, including terminal eyelets adjacent the distal end of the expansion opening, and next adjacent eyelets next adjacent the terminal eyelets in each array. The terminal eyelets and the next adjacent eyelets are those eyelets closest to the distal end of the expansion opening and which are used for lacing purposes. The method comprises threading first and second lacing elements through the eyelets along the left and right sides of the shoe body including establishing first and second lacing loops of the lacing elements, outside the foot-receiving cavity, each such lacing loop extending to at least one of the eyelets adjacent the distal end of the expansion opening; securing the first and second lacing elements such that the respective lacing elements cannot, in routine lacing use, be removed from the shoe body; threading the first and second lacing loops into and through a clasp along first and second different threading paths so as to establish first and second loop ends emerging from the clasp, each lacing loop having a first loop element extending loosely between the clasp and a first one of the eyelets, and a second loop element extending loosely between the clasp and the shoe body or a second one of the eyelets, the first and second lacing loops passing through the clasp along paths according to which pulling the first and second loops in first and second different directions can progressively draw the loosely-extending lacing loop elements through the clasp; pulling the first and second loops in the first and second different directions so as to draw the loosely-extending loop elements through the clasp, thereby to draw the clasp toward the shoe body and tighten the lacing elements on the shoe body,

and correspondingly to draw the left and right sides of the shoe body toward each other, along the expansion opening; and engaging portions of the first and second lacing elements, at the lacing loops, with respective lacing gripping structure at the clasp, whereby the lacing gripping structure temporarily retains the lacing loops in the tightened configuration.

In some embodiments, the pulling of the first and second loops in the first and second different directions comprises pulling the respective loops from the clasp in directions toward the left and right sides of the shoe body.

In some embodiments, the method includes threading the first and second loops into the clasp through a centrally-disposed receiving aperture.

In some embodiments, the method further comprises releasing the lacing gripping structure from engagement with the lacing loops, and with the lacing loops so released, traversing the lacing loops backward through the clasp so as to re-establish the first and second loosely extending loop elements, whereby the loosely extending loop elements enable drawing the left and right sides of the shoe body away from each other at the expansion opening (20) thereby to enable expanding the expansion opening.

In some embodiments, the method further comprises, to establish the first and second loops, threading the first and second lacing elements each outwardly away from the shoe body through a next adjacent eyelet and then inwardly through a terminal eyelet.

In some embodiments, the method comprises anchoring at least one of the first and second lacing elements to the shoe body at a location on the respective lacing element which is between the respective lacing end and a portion of the lacing element which is adjacent one of the terminal eyelet and the next adjacent eyelet.

In some embodiments, the method further comprises anchoring at least one of the first and second lacing elements to the shoe body inside the foot-receiving cavity.

In some embodiments, the clasp comprises a cover and a receptacle and moving the cover away from the receptacle effectively releases the lacing elements from the gripping structure.

In some embodiments, the gripping structure is embodied, at least in part, in the cover, and moving the cover away from the receptacle moves respective parts of the lacing gripping structure away from the lacing elements.

In some embodiments, the clasp comprises a receptacle and a cover, and tightening the lacing elements on the shoe comprises engaging latch structure on one of the cover and the receptacle with the other of the cover and the receptacle, and subsequently pulling the loops in opposing directions.

In some embodiments, the retaining of the lacing elements in the clasp by the gripping structure is effected by pinching the lacing elements at the respective lacing gripping structure.

In some embodiments, the anchoring of the lacing element to the shoe body further comprises cutting off an end portion of the lacing element.

In some embodiments, the threading of the first and second lacing elements through the eyelets comprises reverse lacing of the lacing elements, wherein ends of the lacing elements are disposed adjacent the proximal end of the expansion opening, wherein the first and second lacing elements are comprised in a single lacing, and wherein a portion of the lacing extends across the expansion opening, between eyelets in the first and second arrays of eyelets, adjacent the distal end of the expansion opening.

In a fourth family of embodiments, the invention comprehends a clasp adapted to receive first and second shoe lacing elements. The clasp comprises a clasp body and a clasp cover. The clasp body comprises at least one receiving aperture adapted to receive the first and second lacing elements, and the clasp further comprises first and second exit apertures by which the lacing elements can pass out of the clasp, and gripping structure effective to grip the lacing elements to thereby temporarily prevent withdrawal of the lacing elements from the clasp.

In some embodiments, structure communicating with the first and second exit apertures operates, at least in part, as the gripping structure.

In some embodiments, the first and second exit apertures are disposed on opposing sides of the clasp.

In some embodiments, the cover is operative to position the gripping structure for engagement with the lacing elements when the cover is closed over the clasp body.

In some embodiments, the method further comprises latch structure on at least one of the clasp body and the cover, and the clasp body and the cover are cooperatively structured such that closure of the cover over the clasp body, with the latch structure engaged, positions the gripping structure for gripping engagement with the lacing element.

In some embodiments, the cover and the clasp body are structured such that moving the cover away from the clasp body releases the lacing elements from engagement with the gripping structure.

In some embodiments, the clasp further comprises at least one loop retainer effective to engage operative ends of the first and second loops, thereby to prevent inadvertent withdrawal of the first and second loops entirely out of the clasp.

In some embodiments, the structure of the clasp enables passage of the lacing elements through the clasp from the at least one receiving aperture through the exit apertures along first and second different paths which emerge on opposing sides of the clasp.

In some embodiments, the clasp comprises first and second exit apertures on a first side of the clasp, and first and second gripping chambers communicating with the first and second exit apertures, the clasp further comprising third and fourth exit apertures on a second side of the clasp, and third and fourth gripping chambers communicating with the third and fourth exit apertures.

In a fifth family of embodiments, the invention comprehends a lacing kit, comprising at least one lacing defining first and second lacing elements; and a clasp. The clasp comprises a receptacle; at least one receiving aperture in the receptacle, adapted to receive the first and second lacing elements, first and second exit apertures by which the lacing elements can pass out of the clasp, and gripping structure effective to grip the lacing elements to thereby temporarily prevent withdrawal of the lacing elements from the clasp.

In some embodiments, the structure communicating with the first and second exit apertures operates, at least in part, as the gripping structure.

In some embodiments, the gripping structure is operable as a one-way mechanical lacing gripper, enabling the lacing elements to pass through the clasp along one or more paths extending away from the receiving aperture and preventing casual withdrawal of the lacing elements from the clasp.

In some embodiments, the lacing element can move longitudinally in alternating opposing directions through the exit apertures when the clasp is configured for gripping the lacing elements, and wherein the gripping structure is in communication with the exit apertures such that the lacing elements can move between the exit apertures and the gripping structure when the clasp is configured for gripping the lacing elements.

In some embodiments, the first and second exit apertures are disposed on opposing sides of the clasp.

In some embodiments, the lacing kit further comprises a cover closeable over the receptacle, operative to position the gripping structure for engagement with the lacing elements when the cover is closed over the receptacle.

In some embodiments, the gripping structure comprises at least one slot in the clasp defined in part by the receptacle and in part by the cover, the slot being expandable by translation of the cover with respect to the receptacle.

In some embodiments, the lacing kit further comprises spaced openings on opposing sides of the clasp, in communication with first and second slots on the opposing sides of the clasp.

In some embodiments, the cover is connected to the receptacle for pivotation with respect to the receptacle to bring the cover into closing engagement over the receptacle, and to open the clasp to provide access to the receptacle.

In some embodiments, the cover is a separate and distinct element, separable from the receptacle for alternating closing the clasp and opening the clasp for access to the receptacle.

In some embodiments, the lacing kit further comprises latch structure on at least one of the receptacle and the cover, and the receptacle and cover are cooperatively structured such that closure of the cover over the receptacle, secured by the latch structure, positions the gripping structure for gripping engagement with the lacing elements.

In some embodiments, the receptacle and cover are structured such that moving the cover away from the receptacle releases the lacing elements from engagement with the gripping structure.

In some embodiments, the clasp further comprises at least one loop retainer effective to engage operative ends of the first and second loops, thereby to prevent inadvertent withdrawal of the first and second loops entirely out of the clasp.

In some embodiments, the lacing kit further comprises a mechanical holding device adapted for attachment to at least one of the lacing elements and adapted to block passage of the respective lacing element through an eyelet of a shoe.

In some embodiments, structure of the clasp enables passage of the lacing elements through the clasp from the at least one receiving aperture through the exit apertures along first and second different paths which emerge on opposing sides of the clasp.

In some embodiments, the first and second paths are mirror-image paths.

In some embodiments, the clasp comprises first and second exit apertures on a first side of the clasp, and a first gripping slot between, and communicating with, the first and second exit apertures, the clasp further comprising third and fourth exit apertures on a second side of the clasp, and a second gripping slot between, and communicating with, the third and fourth exit apertures.

In some embodiments, the slots connect with the exit apertures at elevations displaced from vertical mid-points of the exit apertures, such that, when the lacing loops are pulled away from the clasp in horizontal directions, side edges of the exit apertures interfere with movement of the lacing loops into the slots.

In some embodiments, the slots connect with the exit apertures below the vertical mid-points of the exit apertures.

In a sixth family of embodiments, the invention comprehends, in combination, a shoe, and a lacing system incorporated into the shoe. The shoe comprises a shoe body, a left side and a right side, an aperture for inserting a wearer's foot therethrough for putting the shoe on and taking the shoe off, an expansion opening having a proximal end, and a distal end in communication with the aperture, left and right sides of the expansion opening being defined by left and right edges of respective left and right upper sides of the shoe body. First and second arrays of eyelets are arrayed along the left and right upper sides of the shoe body, adjacent the left and right edges of the expansion opening, including terminal eyelets adjacent the distal end of the expansion opening, and next adjacent eyelets next adjacent the terminal eyelets, the terminal eyelets and the next adjacent eyelets being those eyelets closest to the distal end of the expansion opening and which are used for lacing purposes. The lacing system comprises first and second lacing elements, including respective first and second lacing ends, laced through the eyelets along the left and right upper sides of the shoe body, the first and second lacing elements being anchored to the shoe body at anchor points such that the respective lacing ends cannot, in routine lacing use, be displaced outwardly from the shoe body. The first and second lacing elements define first and second lacing loops. The first and second lacing loops are threaded through a clasp along respective first and second different threading paths, with first and second loop ends emerging from the clasp, each loop having a first loop element extending between the clasp and a first one of the eyelets, and a second loop element extending between the clasp and the shoe body or a second one of the eyelets. The first and second loops pass through the clasp along

paths according to which pulling the first and second loops in first and second different directions draws portions of the loop elements through the clasp.

In some embodiments, the first and second loops are defined by lacing elements which extend outwardly away from the shoe body through a next adjacent eyelet and thence inwardly through a terminal eyelet.

In some embodiments, at least one of the lacing elements is anchored to the shoe body at a location on the respective lacing element which is between the respective lacing end and a portion of the lacing element which is adjacent the terminal eyelet.

In some embodiments, at least one of the lacing elements is anchored to the shoe body inside the foot-receiving cavity, optionally by a mechanical holding device (56).

In some embodiments, the mechanical holding device operates as an enlargement of the respective lacing element, thereby blocking passage of the lacing element entirely out of the foot-receiving cavity through the respective eyelet.

In some embodiments, the mechanical holding device is secured to the lacing element and is anchored to the shoe body at a location displaced from the terminal eyelet.

In some embodiments, at least one of the lacing elements is anchored to the shoe body by adhesive.

In some embodiments, the lacing loops enter the clasp at relatively lower locations in upright use orientation of the clasp, and emerge from the clasp at relatively higher locations.

In some embodiments, the lacing loops traverse the clasp in non-crossing paths.

In some embodiments, the lacing loops traverse the clasp along mirror-image paths.

In some embodiments, the lacing loops enter the clasp through a centrally-disposed receiving aperture and exit the clasp at exit apertures on opposing sides of the clasp.

In some embodiments, the clasp comprises a receptacle, receiving the lacing elements, and gripping structure which grips the lacing elements and thereby temporarily prevents withdrawal of the lacing elements from the clasp.

In some embodiments, the clasp comprises a clasp receptacle, receiving the lacing elements, and gripping structure which grips the lacing elements and thereby temporarily prevents withdrawal of the lacing elements from the clasp.

In some embodiments, the cover can be opened and closed over the receptacle, and closing the cover positions the gripping structure for engaging the lacing elements.

In some embodiments, the receptacle and the cover are structured such that raising the cover releases the lacing elements from engagement with the gripping structure.

In some embodiments, the gripping structure is defined at least in part by the cover.

In some embodiments, the gripping structure is defined at least in part by the receptacle.

In some embodiments, the lacing loops enter the clasp through a receiving aperture and exit the receptacle at first and second exit apertures on opposing sides of the clasp, and structures communicating with the first and second exit apertures operate, at least in part, as the gripping structure.

In some embodiments, the clasp comprises exit apertures, and the gripping structure is in communication with the exit apertures such that the lacing elements can move between the exit apertures and the gripping structure when the clasp is configured for gripping the lacing elements.

In some embodiments, the gripping structure comprises at least one slot in the clasp between the receptacle and the cover, expandable by translation of the cover with respect to the receptacle.

In some embodiments, the combination further comprises exit apertures on opposing sides of the clasp, in communication with the at least one slot.

In some embodiments, the clasp further comprises at least one loop retainer effective to engage operative ends of the first and second loops, thereby to prevent inadvertent withdrawal of the first and second loops entirely out of the clasp.

In some embodiments, the gripping structure comprises a one-way mechanical lacing gripper, enabling the lacing elements to pass through the clasp along one or more paths extending away from the receiving aperture and preventing casual withdrawal of the lacing elements from the clasp.

In some embodiments, the cover is a separate and distinct element, separable from the receptacle for alternating closing the clasp, and opening the clasp for access to the receptacle.

In some embodiments, the combination further comprises latch structure on at least one of the receptacle and the cover, and wherein the receptacle and the cover are cooperatively structured such that closure of the cover over the receptacle, secured by the latch structure, positions the gripping structure for gripping engagement with the lacing elements.

In some embodiments, the first and second lacing elements are embodied in a single lacing, the lacing being reverse laced through the first and second arrays of eyelets, the first and second lacing ends being anchored to the shoe body adjacent the proximal end of the expansion opening, and wherein a portion of the lacing extends across the expansion opening between the eyelets in the first and second arrays of eyelets.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 shows a pictorial view of a first shoe and lacing system of the invention.

FIGURE 2 shows a pictorial view of the shoe and lacing system of FIGURE 1, illustrating cutting the end of one of the lacing elements and with the remaining end of the lacing element confined to the inside of the shoe body by a mechanical holding device.

FIGURE 2A shows a pictorial view as in FIGURE 2, with the lacing reverse laced.

FIGURES 3A and 3B illustrate the mechanical holding device, also seen in FIGURE 2, which holds the end of a lacing element inside the shoe body.

FIGURE 4 shows a pictorial view of a first embodiment of a clasp useful in lacing systems of the invention, with the cover open.

FIGURE 5 shows the clasp of FIGURE 4, with the cover closed on the receptacle, and latched.

FIGURE 6 shows lacings as threaded onto a shoe, with first and second lacing loops threaded into the clasp of FIGURES 4 and 5, with the cover open.

FIGURE 7 shows the lacing loops and clasp of FIGURE 6 with the lacing loops fully threaded through the clasp, and with the cover closed and latched, but wherein the loops extend through the openings on the ends of the slots, and are not yet being gripped by the clasp.

FIGURE 8 shows the stage of tightening the lacing elements on the shoe of FIGURES 6 and 7, with the lacing loops raised relative to the clasp, and not yet being gripped by the gripping elements of the clasp.

FIGURE 9 shows a top pictorial view of the shoe lacing system of FIGURES 6-8, wherein the lacing elements have been pulled tight, and the lacing loops have been lowered, relative to FIGURE 8, so as to pass the lacing loops into gripping engagement with the gripping elements in the slots.

FIGURE 10 shows an enlarged pictorial view of the clasp and lacing loops, with the lacing loops having been drawn tight and gripped by the gripping elements as in FIGURE 9.

FIGURE 11 shows a top pictorial view of the shoe lacing system of FIGURES 6-9, initiating release of the lacing elements from the gripping control of the clasp, wherein the lacing loops have been moved laterally from the gripping condition of FIGURES 9 and 10, and to a condition similar to the condition shown in FIGURE 7.

FIGURE 12 is a pictorial displacement view of a second clasp useful in lacing systems of the invention, with lacing loops in position just prior to being threaded into and through the clasp, and with the cover displaced from the receptacle.

FIGURE 13 is a pictorial displacement view of the clasp of FIGURE 12, with the lacing loops threaded through the receptacle, and the cover positioned over, and displaced from, the receptacle, ready for emplacement on the receptacle.

FIGURE 14 is a pictorial view showing the lacing loops and clasp of FIGURES 12 and 13 with the cover in place on the receptacle, and actively controlling movement of the lacing elements through the clasp.

FIGURE 15 is an exterior pictorial view of the clasp and lacing loops arrangement of FIGURE 14.

FIGURE 16 is a top pictorial view of the shoe lacing system of FIGURES 12-15, with a user pulling the lacing loops tight, and thereby effecting final tightening of the lacing elements on the shoe, similar to the depiction of FIGURE 9 for the first embodiment of the clasp.

FIGURE 17 is a top pictorial view of the shoe lacing system of FIGURES 12-16, showing the cover being raised at initiation of release of the lacing elements from the gripping control of the gripping structure.

FIGURE 18 is a pictorial displacement view of a third clasp useful in lacing systems of the invention, with the cover displaced from the receptacle.

FIGURE 19 is a pictorial view showing lacing loops disposed in the clasp of FIGURE 18, and with the cover closed over the receptacle.

FIGURE 20 is a pictorial view showing the clasp of FIGURES 18-19 being used to loosen lacing loops on a shoe.

FIGURE 21 is a pictorial view of the use of the invention with a clasp of FIGURES 18-19, and illustrating tightening the lacing elements and applying downward force to the clasp cover, thereby to bring gripping structure of the clasp into engagement with the lacing elements.

The invention is not limited in its application to the details of construction or the arrangement of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments or of being practiced or carried out in other various ways. Also, it is to be understood that the terminology and phraseology employed herein is for purpose of description and illustration and should not be regarded as limiting. Like reference numerals are used to indicate like components.

DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

FIGURES 1 and 2 illustrate a shoe 10 in an early stage of using a lacing process of the invention. FIGURE 1 shows the shoe having a shoe body 12. Shoe body 12 has a left side 14 and a right side 16. An aperture 18 is provided for inserting a foot of a wearer into the foot-receiving cavity 19 of the shoe, for putting the shoe on and taking the shoe off. An expansion opening 20 has a distal end 22 in communication with aperture 18, and a proximal end 23 remote from aperture 18. Left 24 and right 26 sides of the expansion opening are defined by left 28 and right 30 edges of the left 14 and right 16 sides of the shoe body. An array of eyelets 36, illustrated as eyelet loops of generally fixed length, and through-apertures in FIGURES 1 and 2, is disposed along the upper portion of each of the left and right sides of the shoe body adjacent the left and right edges of the expansion opening. Each of the eyelet arrays includes a through-aperture terminal eyelet 38 adjacent distal end 22 of the expansion opening, and a through-aperture next adjacent eyelet 40 next adjacent the respective terminal eyelet. The terminal eyelet and the next adjacent eyelet are those eyelets which are closest to distal end 22 of the expansion opening and which are being used for lacing purposes. A second adjacent one 41 of the eyelets is an eyelet loop which is closest to next adjacent eyelet 40, on the opposite side of the next adjacent eyelet from the terminal eyelet.

FIGURE 1 shows a single lacing 42 which includes first 44 and second 46 lacing elements which are threaded through eyelets 36 using a conventionally-known lacing pattern up to and through the next adjacent eyelet. Lacing 42 can, of course, be replaced with two lacing elements, each anchored to the shoe body adjacent the proximal end 43 of the expansion opening. Further, the single lacing 42 can be reverse laced in the invention, as illustrated in FIGURE 2A.

As used herein, "reverse laced" and "reverse lacing" refer to a single lacing wherein the two ends of the lacing are anchored to the shoe body at or adjacent proximal end 23 of expansion opening 20. In such instance, a length of the lacing extends across the expansion opening adjacent the distal end of the expansion opening e.g. between left and right terminal eyelets 38, on the respective left and right sides of the shoe body, whereby the lacing is continuous between the left and right sides of the shoe body at or adjacent the distal end of the expansion opening.

In FIGURE 1, each lacing element extends through the respective next adjacent eyelet along a path which passes from the inside of the shoe body outwardly and away from the shoe body.

Any conventionally operative lacing pattern can be used up to the next adjacent eyelet so long as the lacing elements pass through the next adjacent eyelets in directions which are permissive of simultaneously pulling on the first and second lacing elements, from the outer sides of the next adjacent eyelets, and thereby causing the lacing elements to draw the edges of the expansion opening toward each other, thus to reduce the space across the expansion opening, in a typical manner of tightening the shoe on the foot of a wearer. In some embodiments, such conventionally operative lacing pattern can be used up to, and including at, the terminal eyelet.

In the embodiment illustrated in FIGURES 1 and 2, with the first and second lacing elements passing through the next adjacent eyelets from inside the shoe body, and passing through the shoe body at the next adjacent eyelets in an outward direction, the lacing elements are then threaded through the terminal eyelets in a direction wherein the lacing elements pass from outside the shoe body, through the shoe body at the terminal eyelets, and into the foot-receiving cavity. With the lacing elements threaded loosely through the terminal eyelets in the recited directions, each lacing element forms a lacing loop which extends outwardly of the shoe body between the respective terminal eyelet and the corresponding next adjacent eyelet. Depending how much of the lacing element has been drawn through the terminal eyelet, the left 48 and right 50 lacing ends can be e.g. inside the foot-receiving cavity, or generally outside the shoe body as shown in FIGURE 1. In any event, once the lacing elements have been laced through the terminal eyelets, and before the lacing elements have been drawn tight against the shoe body, each lacing element forms one of the lacing loops. FIGURE 1 shows the respective lacing loops as a left lacing loop 52 and a right lacing loop 54.

FIGURE 2 illustrates the next stage in the process of setting up and using the lacing system of the invention. As seen in FIGURE 2, a mechanical holding device 56 has been attached to the end of the first lacing element. Holding device 56, and its relationship with the lacing element, is further illustrated in FIGURES 3A and 3B.

As seen in FIGURES 3A and 3B, holding device 56 has a first panel 58, and a second panel 60 hingedly joined to panel 58 at hinge element 62. Holding device 56 has a first aperture 64 in first panel 58 and a second aperture 66 at hinge element 62. A latch 68 is disposed on the distal end of second panel 60. As illustrated in FIGURE 2, end 48, and thus first lacing element 44 has been threaded into the holding device at first aperture

64, and out of the holding device at second aperture 66, whereby a length of the lacing element extends across first panel 58.

With the lacing element in place, the second panel is closed on the first panel, and latch 68 is engaged to thereby latch the second panel closed on the first panel in the direction shown by arrow 67. With the second panel thus closed on the first panel, holding device 56 comprises a cavity 70 between the first and second panels. As shown in FIGURE 3B, lacing element 44 passes through the cavity.

Holding device 56 is made of a material which is sufficiently rigid that, with the second panel closed and latched on the first panel, the first and second panels grip the lacing element sufficiently e.g. at apertures 64, 66, to prevent the lacing element from being withdrawn from the holding device while the holding device is so closed and latched, thus to block passage of the lacing element through the eyelet. For example, a variety of thermoplastic materials can be selected, such as various ones of the polyolefins, exemplary of which are polyethylene and polypropylene, homopolymers and copolymers, and the like for use in fabricating holding device 56. As desired, hinge element 62 can be made from the same material as the first and second panels, or can be different, as known in the art of hinging thin-section polymeric elements.

Panels 58, 60 can be any thicknesses desired so long as the panels can be hinged as described, and are effective to grip the lacing element. Further, panels 58, 60 and apertures 64, 66 can be configured, as desired, to more effectively hold any one or more of the wide variety of lacing cross-sections which may be used with a particular holding panel. A range of thicknesses of holding panel material can be so defined for each material which is suitable for use in the holding device; and the range of thicknesses depends on the material selected for use in making the holding device, as well as the specifications of the lacings contemplated to be used therewith, and such ranges are known to those skilled in the plastics, and like, arts.

With holding device 56 so secured on lacing element 44, such that the lacing element cannot be drawn through the holding device, the lacing element is effectively anchored to the shoe body by the holding device such that the lacing element cannot be withdrawn from the shoe body through the terminal eyelet. Neither can that portion of the lacing element, which is inward, in the shoe, of the holding device 56, be withdrawn from the shoe body through terminal eyelet 38. With the lacing element so secured to the shoe body, the lacing element is cut adjacent the holding device as illustrated at scissors 72 in FIGURE 2, whereby a cut-away end portion 74 of the lacing element is removed and discarded, and a new lacing end 76 is created. Lacing element 46 is similarly

secured such that the new lacing end 76 is prevented from passing outwardly through the terminal eyelet.

Any number of structures and procedures can be used for retaining the new lacing ends, or the original lacing ends if end portion 74 is not cut away, inside the shoe body, or otherwise anchored to the shoe body so as to provide an anchor point on the lacing beyond which the lacing element cannot be withdrawn from the terminal eyelet, eyelet loop, or other eyelet substitute structure.

For example, in the illustrated embodiment of FIGURE 2, the holding device prevents the new lacing end from being withdrawn through the terminal eyelet, but does not prevent movement of the new lacing end further inwardly of the terminal eyelet than shown. The holding device accommodates temporarily drawing any desired further length of the lacing element inwardly through the terminal eyelet. Thus, the lacing element is blocked from moving outwardly of the shoe body at a location on the lacing element which is between the lacing end and a portion of the lacing element which is adjacent the terminal eyelet when the anchor is adjacent the terminal eyelet, while being free to move inwardly of the shoe body. In such case, the word "anchored" is permissive of movement of the lacing element away from, but not through, the eyelet with which the lacing element ultimately engages.

In the alternative, the lacing element can be otherwise anchored to the shoe body. For example, an alternative enlargement can be created or placed, and preferably fixed, on or in the lacing element at the location on the lacing element which represents/defines an extremity of an end portion of the lacing element which is to be retained inside the foot-receiving cavity of the shoe body. Such enlargement can be, for example, any structure which can be so secured to the lacing element as to prevent the lacing element from being withdrawn back through the terminal eyelet. Thus, there can be mentioned a wide variety of clasps, clips, brackets, clamps, localized impregnations, localized coatings, and the like.

In a simple embodiment, the lacing element can be knotted on itself to create an enlargement in the lacing element, whereby the knot is suitably large to block passage of the lacing element entirely out of the foot-receiving cavity through the terminal eyelet. An example of knots on the lacing element being used to limit movement of the lacing element through an opening is shown at knots 77 in FIGURE 2A. FIGURE 2A shows knots 77 being used to limit movement of the lacing element through eyelet loops 36 at the proximal end of the expansion opening. Similar knotting can be employed in the lacing element to limit movement of the lacing element ends, proximate terminal eyelets

38, toward distal end 22 of the expansion opening. In the alternative, knots 77 can be replaced by e.g. thermoplastic beads which are embedded in the lacing at respective critical locations.

In yet another set of embodiments, a selected location on the lacing element, e.g. adjacent the lacing end, can be fixedly secured to the shoe body, either at the outside surface of the shoe body, e.g. adjacent an eyelet, or inside the shoe body after passing through an eyelet. In such instance of fixed securement, the end of the lacing element can, but need not necessarily, pass outwardly, rather than inwardly, through the terminal eyelet, and then be fixed to e.g. the outer surface of the shoe body if desired.

Any suitable device can be used to anchor the e.g. end portion of the lacing element to the shoe body. There can be mentioned, for example, a button on one of the shoe body and the lacing element, and a corresponding button hole on the other of the lacing element and the shoe body. There can be mentioned cooperating male and female snaps on the respective lacing element and the shoe body. A clip can be mounted on the shoe body for gripping the lacing element, or on the lacing element for gripping the shoe body, for grasping and fixedly holding the lacing element and the shoe body to each other. Any securing device which securely defines an end of the respective loop, which cannot be readily displaced from the shoe body without release by the securing device, is acceptable.

As a further alternative, the lacing element can be anchored to the shoe body e.g. at a location displaced from the terminal eyelet such as by adhesive or mechanical anchoring structure, either inside the foot-receiving opening, or on the outside surface of the shoe body.

Typically, where the end of the lacing element is anchored to the shoe body inside the foot-receiving cavity, the end of the lacing element extends through the shoe body at the terminal eyelet, or other opening in the shoe body, in passing into the foot-receiving cavity toward the end of the lacing.

As yet another option, the effective end of the lacing element can be affixed to the shoe body, for example but without limitation to the outside surface of the shoe body, so long as the effective end of the lacing element cooperates with the next eyelet, typically the terminal eyelet, in forming a loop of the lacing element.

One can, of course, skip the terminal eyelet and select a different eyelet for forming the loop, and still obtain the loop benefit of the invention. In such embodiments where the effective end of the lacing element is anchored to the shoe at a location displaced from the traditional location of the terminal eyelet, then the opposing end of the

respective lacing loop can pass through any desired eyelet at or proximate the distal end of the lacing pattern. Thus, for example and without limitation, the end portion of the lacing element can pass outwardly through the terminal eyelet and thence be anchored to the shoe body at a location, preferably on the exterior of the shoe body, which is convenient to formation and manipulation of the respective lacing loop 52 or 54. In such case, the portion of the loop which is shown in FIGURES 1 and 2 as passing outwardly through the shoe body at next adjacent eyelet 40, instead passes outwardly through the shoe body at the structure which is designated as terminal eyelet 38.

As a general statement, then, the proximal end of the loop passes through an eyelet, or eyelet equivalent, which can be any desired eyelet at or adjacent the distal end of the lacing pattern; and the distal end of the loop is anchored to the shoe body, sufficiently close to the proximal end of the loop, inside or outside the shoe body, to establish the structure, and operational features of the loop, established to the extent that the loop cannot be rendered ineffective by pulling the distal end of the loop away from the shoe body.

Whatever the mechanism for holding the end of the lacing element to the shoe body, that portion of the loop which connects to the remainder of the lacing pattern, as the lacing element is laced through the remaining eyelets, extends through an eyelet or other structure in the shoe body which accommodates free passage of lengths of the lacing element therethrough as the lacing element is tightened on the shoe body, and loosened with respect to the shoe body. In the embodiment illustrated in FIGURE 2, the loops are defined by lacing elements which extend outwardly away from the shoe body through the next adjacent eyelet 40 and thence inwardly through the terminal eyelet 38. The resulting loops in FIGURE 2 traverse from the next adjacent eyelet to the terminal eyelet on the exterior of the shoe body, preferably but without limitation, without crossing over the edge 28 or 30 of the side of the shoe body.

As used herein, and in the claims which follow, except where otherwise designated, the words "eyelet" and "eyelets" refer to the full range of structures which are, and can be, used in developing a lacing pattern on a shoe, or in otherwise holding lacing elements on a shoe in such a way that pulling on the lacing elements tends to close the expansion opening. Thus, there can be mentioned lacing apertures through the shoe body, such as shown at terminal eyelet 38 and next adjacent eyelet 40. Such apertures can be, in addition, lined with apertured rivets or grommets, or not. There can be mentioned eyelet loops of generally fixed lengths and made of fibrous fabric, as shown in FIGURES 1 and 2 between through eyelet 40 and the proximal end of the expansion

opening. Such eyelet loops can be oriented, as shown, such that the apertures, through such eyelet loops, are generally oriented for passage of a lacing element through such apertures in a direction generally oriented along the length of the shoe, or in any other direction, such as across the width of the shoe. The eyelet loops can be metal loops, plastic loops, or other material, as alternatives to fabric loops. The eyelet loops can be resiliently stretchable, but return generally to their former rest lengths when the stretching force is withdrawn.

In the alternative, the shoe can be structured with e.g. conventionally-known metal hooks in place of some or all of the eyelets or eyelet loops.

All such lacing structures, which are part of the shoe, and all equivalents thereof, are thus included in the meanings of "eyelets" and "eyelet loops".

With the ends of lacing elements 44 and 46 anchored to the shoe body, and with lacing loops 52 and 54 so established that the ends of the loops cannot be displaced from the shoe body, lacing loops 52, 54 can be threaded through a clasp 78. A first embodiment of a clasp 78 is illustrated in open configuration in FIGURE 4, and in closed configuration in FIGURE 5. Initial threading of the lacing loops through the clasp is illustrated in FIGURE 6. The threaded clasp is shown closed in FIGURE 7. The tightening of the lacing loops, and thus drawing of the sides of the shoe body toward each other on the foot of a wearer, by pulling the loops 52, 54 generally away from each other, is illustrated in FIGURE 8. Engaging the lacing elements of lacing 42 to the gripping elements of clasp 78 is illustrated in FIGURES 9 and 10.

Returning to FIGURE 4, clasp 78 includes a receptacle 80 and a cover 82. Cover 82 is connected to receptacle 80 by hinge 84, for pivotation with respect to hinge 84 so as to bring the cover into closing engagement over the receptacle, and to open the clasp to provide access to the receptacle. As seen in FIGURE 4, receptacle 80 has a centrally-disposed receiving aperture 86 at the bottom 88 of the receptacle, and left 90 and right 92, and front 94 and back 96 receptacle sides extending away from the receiving aperture. The left, right, front, and back sides of the receptacle correspond to left, right, front, and back sides of the clasp.

As seen in FIGURE 4, cover 82 is hingedly attached to the receptacle, through hinge 84, at the back side edge of the receptacle. Correspondingly, an end of the cover, distal from hinge 84, extends over the front edge of the receptacle. A cover latching element 98 is disposed on the distal end of the cover. A receptacle latching element 100 is disposed on the front edge of the receptacle.

In the alternative, the latch structure can be confined to one or the other of the receptacle and the cover, whereby the other of the cover and the receptacle represents a passive element with respect to latching the cover and the receptacle to each other.

Latching elements 98 and 100 collectively define cooperative latch structures which can be latched to each other when the cover is closed on the receptacle as illustrated in FIGURE 5. Closure of the cover over the receptacle, secured by the latch structure, brings the edges of the receptacle and cover together to define gripping structure 97 at the left and right edges of the receptacle cover.

The respective side edges of the receptacle and cover are generally rigid so as to be generally non-flexible in normal use. At each side of the clasp, the collective edges of the receptacle and cover define a slot between the edges at the respective side of the clasp. The distance across the slot, between the cover edge and the receptacle edge, is sized such that a lacing element 44, 46 in the slot is effectively pinched between the cooperating edges of the receptacle and the cover. Such pinching action constitutes one form of the above noted gripping, wherein the side edges of the receptacle and cover cooperate with each other, as the gripping elements.

In the alternative, one of the receptacle side edge and the cover side edge can project toward the other of the cover and the receptacle, while the other of the receptacle side edge and the cover side edge projects away from the projecting edge, and presents a more flattened or blunt surface against which the projecting edge can pinch the lacing elements.

As illustrated in the embodiment of FIGURE 5, with the cover closed on the receptacle, left 102 and right 104 side edges of the cover overlie respective left 106 and right 108 side edges of the receptacle. A left slot 110 is defined between left side edge 102 of the cover and left side edge 106 of the receptacle. A right slot 112 is defined between right side edge 104 of the cover and right side edge 108 of the receptacle. Exit openings 114 between the cover and receptacle are disposed at the respective four corners of the clasp on opposing ends of slots 110 and 112, and are in communication with the slots. In addition, apertures 114 are so positioned relative to slots 110, 112, that the slots communicate with apertures 114 at elevations displaced from the vertical mid-portions of the apertures. With the loops threaded through, and extending outwardly from, the clasp, and with the clasp closed and latched, the lacings/lacing elements are ready for use in tightening the shoe on the wearer's foot. At that stage, each loop has a first loop element extending at least somewhat loosely between the clasp and a first one of the eyelets, and a second loop element extending at least somewhat loosely between

the clasp and the shoe body or a second one of the eyelets. The lacing elements are then tightened by grasping the loops as illustrated in FIGURE 8 and pulling the ends 116 of the loops in different directions which do not tolerate movement of the lacing loops into slots 110, 112. FIGURE 8 shows the loops being drawn in generally opposing left and right directions, each with an upward vector.

As the user pulls the lacing loops 52, 54 away from each other, elements of the respective lacing elements move lengthwise through apertures 114 and thus through the clasp. As the lacing elements are drawn through the clasp, any loose portions of the lacing elements between the clasp and the shoe body are drawn through the clasp, the clasp is drawn toward the shoe body, and the lengths of the lacing elements are progressively drawn through the clasp.

In FIGURE 6, the slots are positioned generally below the vertical mid-points of the openings defined by apertures 114. The critical relationship is that, starting with the loops extending out of apertures 114 as in FIGURE 7, when loops 52, 54 are pulled outwardly, at angles out of alignment with the entrances from apertures 114 to slots 110, 112, for example, an upward vector/angle as shown in FIGURE 8, the lacing elements 44, 46 pass freely through apertures 114, and the structure and positioning of the slots 110, 112 is such that, in spite of the force urging the lacing elements toward slots 110, 112, the lacing elements do not move transversely into slots 110, 112.

Thus, a typical tightening of the lacing elements on the shoe, and corresponding tightening of the shoe body on the foot of the wearer, accompanied by drawing clasp 78 tight against the shoe, is accomplished by grasping loops 52, 54 as shown in FIGURE 8, and pulling the loops away from each other. The pulling force preferably is horizontal or has an upward vector.

Such pulling of the loops 52, 54 has a transverse tension component which urges side-by-side strands/legs of each loop toward each other and thus toward and into slots 110, 112. But because of the low positioning of the openings from apertures 114 into the slots, the side edges of apertures 114 interfere with unintended movement of the loop material into the slots. Similarly, the openings from apertures 114 into slots 110, 112 are so constrictive as to cooperate in interfering with movement of the lacing loop material into the slots until the lacing loops are lowered.

Once lacing loops 52, 54 have been pulled as tight as desired, once the lacing elements are as tight as desired on the shoe, the user moves the ends of the loops, while still held tight, in a downward direction relative to the bottom of the clasp as at FIGURE 10. As the loops move down, toward the bottom of the clasp, the loop elements at

apertures 114 move downward correspondingly with respect to the apertures and into alignment with the entrances to slots 110, 112, toward the bottoms of apertures 114. With the loop elements at the entrances to the slots, the transverse vectors of the pulling forces cause the loop elements to move transversely into the slots. As the loop elements move into the slots, they move into pinching engagement with the respective pinching edges 102, 104, 106, 108 of the cover and receptacle, wherein an ad hoc identifiable distinct locus of the lacing element, along the length of a given lacing loop element, becomes pinched as the lacing loop element enters the slot. With the lacing loop element so pinched, the pinched locus of the loop element can move transversely along the slot, but the loop element cannot move along the length of the lacing element through the slot. Namely, the pinching effect on the loop element is such that the loop elements are so severely deformed at the pinch site that the lacing element cannot be readily moved longitudinally through the slot. Thus, the lacing element is securely held in the slot by the gripping edges of the cover and the receptacle, secure against longitudinal movement of the loop elements/lacing elements with respect to the clasp.

Openings 114 are sufficiently large to accommodate longitudinal movement of the lacing elements through the openings in either the forward direction, which tightens the lacing elements on the shoe, or the backward direction, which loosens the lacing elements with respect to the shoe. Slots 110, 112 are sufficiently small, and the edges of the cover and receptacle sufficiently rigid, that lengthwise movement of the lacing elements through the slots in either the forward direction or the backward direction are effectively estopped.

The location of apertures 114 relative to the lengths of the slots is not limited to the corners of the clasp. Indeed, apertures 114 can be anywhere along the lengths of the slots so long as the lacing elements can be moved between apertures 114 and slots 110, 112 as desired, for the operational features described herein.

Apertures 114 need not be generally circular as shown. Rather, apertures 114 can be any configuration which accommodates longitudinal movement of the lacing elements through the apertures 114 while accommodating movement of the lacing elements back and forth between the slots and apertures 114.

As illustrated in FIGURES 6 and 7, lacing loops 52, 54 follow first and second different threading paths through clasp 78 entering the clasp at a relatively lower location at receiving aperture 86 and emerge from the clasp at relatively higher locations at exit apertures 114; and when confined, emerge at slots 110, 112. The paths traversed by the lacing loops through the clasp typically do not inherently cross, and are typically mirror-

images of each other. However, it is entirely acceptable in the invention that the paths can cross and/or that the paths are not mirror-images of each other.

It should be noted that the lacing loops initially generally extend through openings 114 when the clasp is closed and, after tightening of the lacing loops, the lacing material of the lacing loops is moved into slots 110 and/or 112 by lowering the loops while maintaining the tightening/pulling force, thus the tension, on the loops. Once the loops move into slots 110, 112, the slots operate as gripping structure to prevent longitudinal movement of the lacing elements through the slots whereby the tension/force on the lacing loops can be released.

The lacing elements can be drawn as tight as desired on the shoe, such that the lacing elements draw expansion opening 20 relatively closed on the foot of the wearer, and draw the clasp tightly against the shoe body. With the lacing elements so tightened as desired, and the clasp drawn as tightly as desired against the shoe body, the user moves the loop elements of the lacing elements into the slots and subsequently relaxes the pulling force on the lacing loops.

Before drawing on the loop ends in tightening the lacing elements on the shoe and clasp, one can, of course, pull on the loose lacing elements between the clasp and the shoe to thereby initiate closure of the expansion opening about the foot of the wearer. It can be especially helpful to pull on the lacing element which is positioned between the clasp and the eyelet through which the loop passes, and which is positioned more toward the proximal end of the expansion opening, thus to snug the lacings in the eyelets which are typically arrayed along the edge of the expansion opening.

When the user does pull on the loop ends, it is helpful to first draw any loose lengths of the lacing elements into and through the clasp. As the loops are pulled, it is helpful to let the two strands or legs of a given loop be pulled through the clasp independently, so as to tighten both legs of the loop simultaneously. The end 116 of a lacing loop is thus defined dynamically, and changes locations along the length of a given lacing element according to those lengths of the loop which are emergent from the clasp at any given time. Thus, as a lacing loop is drawn through the clasp, and tightened, the location, on the lacing element, of the respective loop end 116 can change as the loop is being pulled. Thus, the user can well let the lacing loop end slip through his/her fingers as the loop is tightened. For example, the user can insert a finger in the loop and pull with that finger, whereby the loop, and loop end 116, are free to move with respect to the finger as the loop is tightened.

When it is desired to loosen the lacings such as to remove the shoe from the foot of the wearer, latching elements 98, 100 can be released from each other, and the cover raised, which translates the cover with respect to the receptacle, expanding the distance between the edges of each of the slots, and releasing the loops, and thus the lacing elements, for complete removal of the lacing elements from the clasp. Thus, raising the cover releases the lacing elements from engagement with the gripping structure.

In the alternative, the user can grasp the loops as shown in FIGURE 11, and move opposing legs of each loop in opposing directions transversely across the clasp, along the slots, to respective ones of the openings 114. Once the loop elements reach the openings 114, the lacing elements, which define such loop elements, are free to move backward through the openings, through the inner cavity of the clasp, and through the receiving aperture and out of the clasp.

However, as the ends of the loops are thus drawn toward the clasp, the loops are drawn about the side edges of the cover and the receptacle and become lodged in slots 110 and 112, which prevent the ends of the loops from inherently passing into the inner cavity of the clasp. The slots thus operate as loop retainers to prevent the ends of the loops from unintentionally, casually passing out of, being withdrawn from, the clasp.

Clasp 78 can be made of any material which is sufficiently rigid that, with the cover closed and latched on the receptacle, the gripping elements grip the lacing elements sufficiently to prevent the lacing elements from being withdrawn from the clasp while the clasp is so closed and latched.

For example, a variety of thermoplastic materials can be selected, such as various ones of the polyolefins, exemplary of which are polyethylene and polypropylene, homopolymers and copolymers, and the like. As desired, hinge 84 can be made from the same material as the receptacle and cover, or can be different, as known in the art of hinging thin-section polymeric elements.

Receptacle 80 and cover 82 can be any thicknesses desired so long as the receptacle and cover can be hinged as described, and wherein the gripping structure of slots 110, 112 can be configured to effectively grip the lacing elements. A range of thicknesses can be so defined for each material which is suitable for use in the clasp; and the range of thicknesses depends on the material selected for use in making the clasp as known by those skilled in the plastics art.

In another set of embodiments, not shown in the drawings, a one-way clasp, otherwise similar to clasp 78 of FIGURES 1-11, is used. In the one-way clasp, edges 102, 104, 106, and 108 are cooperatively structured and configured such that at least one

of the side edges, receptacle or cover, at each of the left and right sides of the clasp, is structured, oriented, arranged and configured so as to act as a one-way control gate, or control valve, whereby the respective edge or edge portion flexes outwardly away from the clasp when a lacing element/loop is drawn forwardly through the clasp, in tightening the lacing element on the shoe; and flexes backward, thereby to pinch the lacing element against the other edge which defines the slot, when the lacing element is urged in the opposite, backward direction.

Such structure can include, for example, a flexible edge which has a pinching rest position with an outward flexibility with respect to the clasp. As pulling force, namely tightening of the lacing elements, is relaxed, the side edges of the receptacle and cover retract from their flexed conditions, and act as gripping elements, gripping the lacing elements at slots 110, 112.

Another exemplary structure on either of the cover of receptacle of FIGURES 1-11 has a rigid edge, but the edge projects outwardly and generally downwardly across the slot opening, to define a tapering slot width, the cross-section thus being generally constant in the width direction between apertures 114 and varying top-to-bottom, when viewed along the direction of travel of the lacing element. The slot thus presents one or more of the edges 102, 104, 106, 108 at the slots 110, 112 as contact surfaces, flat or arcuate, wherein the contact surfaces project toward/into the respective top/bottom surfaces of the lacing elements as the lacing elements are urged backward through the slot. In such structure, the dimension across the slot opening is such as to tend to pinch the lacing element, but the flat or arcuate surfaces facilitate forward movement of the lacing sufficiently to overcome the tendency to pinch the lacing element when the lacing element is being tightened with respect to the shoe and clasp, while the projecting edges dig into the lacing element when the lacing element is pulled backward, thus preventing such backward movement.

FIGURES 12-17 illustrate a second embodiment 278 of the clasp, and its use in the invention. In order to distinguish the clasp of FIGURES 12-17 from the clasp of FIGURES 1-11, a prefix "2" is used in designating certain ones of the elements of clasp 278. As seen in FIGURES 12 and 13, clasp 278 includes a receptacle 280, and a cover 282 as a separate and distinct element. Receptacle 280 has a bottom wall 288, a foreshortened left side wall 290, a foreshortened right side wall 292, a full height front wall 294, and a full height back wall 296. Bottom wall 288 comprises gripping flaps 297 which depend from left and right sides of the receptacle at the bottom of the receptacle and

function as gripping structure in the embodiment of FIGURES 12-17. Gripping flaps 297 extend inwardly from left and right edges of the bottom of the receptacle.

The rest position of flaps 297 is generally aligned with the plane of the bottom of the receptacle as illustrated in FIGURE 12. Left and right folds 299 on left and right flaps 297 create receiving aperture 286. As flaps 297 are raised from the rest position of FIGURE 12 toward the draw-in position of FIGURE 13, the raising expands the size of aperture 286 and develops a resilient restorative force urging flaps 297 back toward the rest position of FIGURE 12.

Cover 282 includes a top panel 283, and left 202, right 204, front 206, and back 208 side walls depending downwardly from top panel 283. Ramped ears 285 extend outwardly to the left and right from the left and right side walls. Loop retainers 287 extend down from left and right sides of top panel 283, adjacent left and right side walls 202 and 204, and generally centered front-to-back on side walls 202 and 204.

FIGURE 12 shows clasp 278 with the cover lifted slightly away from the receptacle. Loop ends 116 are juxtaposed adjacent receiving aperture 286 of the receptacle, and gripping flaps 297 are in their rest position, generally aligned with the bottom of the receptacle.

FIGURE 13 shows loop ends 116 threaded through the clasp. Loop ends 116 enter the receptacle at receiving aperture 286 and extend upwardly from the receiving aperture and out of the clasp at the left and right exit openings 214 between the top wall and the foreshortened left and right side walls 290, 292 of the receptacle.

As the loop ends are pulled away from each other, and away from the clasp, gripping flaps 297 are flexed upwardly as shown in FIGURE 13. Once the lacing loops 52, 54 are properly threaded through clasp 278, cover 282 is installed over the receptacle as shown in FIGURE 14, with ramped ears 285 under flaps 297. When the cover is installed on the receptacle as shown in FIGURE 14, the resilient biasing force of gripping flaps 297 urges the gripping flaps of the receptacle against the left and right side walls 202, 204 of the cover. Lacing loops 52, 54 are thus trapped, e.g. pinched, between the gripping flaps 297 and the left and right side walls 202, 204 of the cover, with the resilient restorative forces in the gripping flaps urging the lacing loop elements against the side walls of the cover.

In such condition, the loop ends 116 can be pulled away from each other thus to draw the loops tight as described for the embodiment of FIGURES 1-11. And as a lacing element begins to move backward through the clasp, the respective lacing element is drawn against the respective distal edge 301 of the respective gripping flap 297, and

catches on the distal edge of the respective gripping flap such that the length of the lacing element cannot slide relative to the gripping flap. As the lacing element pulls against the distal edge of the gripping flap, the lacing element begins to deform about the distal edge of the gripping flap, whereby the distal edge of the gripping flap becomes embedded in the lacing element, and pinched against the respective side wall 202 or 204 of the cover, thereby preventing the lacing element from moving longitudinally of the lacing element past the distal edge of the gripping flap. The lacing element is thus gripped, pinched, between the distal edge of the gripping flap and the respective side wall 202, 204 of the cover, much like the lacing element is gripped, pinched by edges 102, 104, 106, 108 in the embodiments of FIGURES 1-11.

In light of the above described relationship between the gripping flaps and the left and right side walls of the cover, in gripping a lacing element as the lacing element begins to move backward through the clasp, gripping flaps 297 effectively prevent unintentional and casual movement of the lacing elements backward through the clasp when the cover is installed over the receptacle as shown in FIGURE 14.

With the cover so installed, the lacing loops can be pulled in different directions, preferably away from each other, as shown in FIGURE 16, as tight as desired in order to bring the lacing elements into tightened relationship along the side edges of expansion opening 20, thus to tighten the shoe about the foot of the wearer. When the tightening force is released, gripping flaps 297 grip the lacing elements and thereby prevent the lacing elements from passing backward through the clasp and becoming unintentionally loosened on the shoe.

When it is desired to release the lacing elements from the tight grip of gripping flaps 297, cover 278 is raised as shown in FIGURE 17. As the cover is raised, ramped ears 285 lift upwardly on gripping flaps 297, releasing the lacing elements from the grip of the gripping flaps, thereby enabling the lacing elements to move longitudinally backward through the clasp.

Where it is desired simply to loosen the lacing elements, the cover is raised only a modest distance, e.g. less than half the height of the clasp, to release the lacing elements. In such position, loop retainers 287 intercept loop ends 116 and prevent the loop ends from traversing backward through the clasp, whereby the loops are prevented from inadvertently becoming unthreaded from clasp 278.

Where the lacing elements are to be removed from the clasp, cover 282 is lifted out of the receptacle, whereafter the lacing loops can easily be withdrawn from receptacle 280 as desired.

FIGURES 18-19 illustrate a third embodiment 378 of the clasp, and its use in the invention. In order to distinguish the clasp of FIGURE 18-19 from the clasps of FIGURES 1-17, a prefix "3" is used in designating certain of the elements in FIGURES 18-19.

As seen in FIGURES 18-19, clasp 378 includes a receptacle 380, and a cover 382 as an element separate and distinct from the receptacle. Receptacle 380 has a bottom 388, and a top 389, a foreshortened left side wall 390, a foreshortened right side wall 392, a full height front wall 394, and a full height back wall 396.

Receptacle 380 has a centrally-disposed receiving aperture 386 which extends from bottom 388 to top 389. Each of the front and back walls 394, 396 has first and second upstanding ribs 395 which extend into receiving aperture 386. A first separator 397 extends inwardly into aperture 386 from left side wall 390. A second loop retainer 397 extends inwardly into aperture 386 from right side wall 392. Male latch elements 393 extend into aperture 386 from centrally-disposed upper locations on the front 394 and back 396 walls of the receptacle.

Cover 382 includes a top panel 383, and left 302, right 304, front 306, and back 308 side walls depending downwardly from top panel 383. Optional grasping ribs 385 extend outwardly to the left and right from the left 302 and right 304 side walls of cover 382. Cover 382 further comprises first and second rib-receiving channels 399 which extend from the bottom of the respective front and back walls up to top panel 382, and which slidingly receive the corresponding guide ribs 395 of receptacle 380, so as to guide up and down movement of cover 382 with respect to receptacle 380. Cover 382 also includes female latches 398, centrally located on front and back walls 306, 308. Female latches 398 cooperate, with modestly overlapping tolerances, with male latches 393, in latching cover 382 to receptacle 380. Cover 383 further includes, on each of left 302 and right 304 side walls, an upwardly-extending channel 391 which extends, along its length, from the bottom of the respective side wall up to the base of the respective grasping rib 385.

Clasp 378 is used as follows. Lacing loops 52, 54, laced in a shoe as at FIGURES 1, 2, or 2A, are threaded upwardly through aperture 386 in receptacle 380 and out the left and right side walls 390, 392, optionally without the lacing loops crossing, and above the tops of the foreshortened side walls. With the end 116 of each lacing loop drawn beyond the respective side wall 390 or 392, the twin strands of the respective lacing loops are positioned in the recesses 387 of aperture 386 which lie to the front and rear of each of separators 397.

With the lacing loops 52, 54 thus threaded through receptacle 380, cover 382 is assembled to receptacle 380 by forcing female latch 398 over male latch 393, whereby latches 393 and 398 provide engagement between the receptacle and the cover while accommodating up and down free sliding movement of the cover with respect to the receptacle. Thus, when the receptacle and cover are so engaged, latched to each other, male latches 393 can slide up and down in slots 381 of female latch 398. While the cover and receptacle can be subsequently separated from each other, such separation requires again forcing the outward extremity 379 of female latch 398 past the outward extremity 375 of male latch 393, and wherein extremities 375 and 379 overlap each other laterally so as to resist such separation.

The male and female latches can, of course, be reversed such that the male latches are on the cover and the female latches, with their slots 381, are on the receptacle. Similarly, other latch structure can be devised for holding the cover and receptacle to each other, whereby the latches shown are merely illustrative of the latches which can be employed to assemble the clasp, thereby to hold the receptacle and cover in assembled relationship with respect to each other.

Meanwhile, the assembly of the cover and receptacle to each other brings the left and right side walls into close proximity with the lacing loops 52, 54 such that the lacing loops are closely held in the space between the bottoms of the side walls 302, 304 of the cover and the tops of side walls 390, 392 of the receptacle. Given the initial engagement of the cover and receptacle, the lacing loops are still sufficiently loosely held that the lacing loops can be advanced in either direction longitudinally of lacing 42, either forward or backward, through clasp 378.

In order to tighten the lacing on the shoe, the user pulls the lacing loops away from each other as described earlier, and pushes down on cover 382 to thereby close the clasp. Pulling the lacing loops away from each other tightens the lacing on the shoe, and draws clasp 378 against the shoe. Preferably, the lacing loops are pulled with sufficient force to draw the clasp tightly against the shoe.

With the lacing loops pulled away from each other, e.g. with a finger in each loop, and held at the desired degree of tightness, the user presses down on cover 382, thus moving the cover down into the receptacle so that the clasp is closed, with the bottom surface of top panel 383 in proximity with top 389 of the receptacle at the front and back walls of the clasp. When the clasp is closed, the bottom surface of the top panel 383 is preferably in contact with top 389 of the front and back walls of the clasp.

Such downward movement of the cover with respect to the receptacle is guided by cooperating guidance expressed collectively by guide ribs 395 and guide channels 399, which moves the left 302 and right 304 side walls of the cover into facing relationship with the foreshortened left 390 and right 392 side walls of the receptacle, with respective elements of the lacing loops 52, 54 disposed between walls 302 and 390, and between walls 304 and 392.

Cover 382 and receptacle 380 are so dimensioned that the clearance distance, namely the spacings between side walls 302 and 390, and between walls 304 and 392, are less than the rest cross-section of the respective lacing. Thus, in the closed clasp condition, lacing 42 is compressed between the side walls of the receptacle and the cover whereby the side walls of the receptacle and cover thus operate as gripping elements, effectively gripping and holding the lacing elements, prevent movement of the lacing elements through the clasp. The cover and receptacle are so dimensioned, relative to each other and to the lacing, that the degree of compression of the lacing, and the length over which the lacing is compressed, when the cover is in the down position, are collectively effective to prevent longitudinal movement of the lacing relative to the receptacle.

Such fully assembled clasp, with the lacing therein, is illustrated in FIGURE 19. FIGURE 19 shows that elements of the lacing loops extend from the clasp at exit apertures 373 which are defined between the tops of the side walls of the receptacle, and the bottom surface of top panel 383 of the cover.

Another expression of the use of the invention in the context of the embodiments of FIGURES 18-21 is as follows. The lacings are initially threaded through the shoe in a normal pattern, except as shown at the top pair of eyelets, namely the terminal eyelet and the next adjacent eyelet, where the threading accommodates subsequent formation of the lacing loops, as illustrated in e.g. FIGURES 1 and 2. Next, the user puts the shoe on his/her foot, and pulls the lacing elements to a taught yet comfortable position through all of the eyelets, including the terminal eyelets and the next adjacent eyelets.

The loose ends of the lacing elements are then extended past the toe of the shoe, and the lacings are marked at locations about 1.5 inches beyond the toe of the shoe. Next, the user ties a knot in each lacing element at the marked locations. Then the user pulls the lacing elements back through the terminal eyelets, but preferably not back through the next adjacent eyelets, until the knots prevent further advance of the lacing elements through the terminal eyelets, thereby developing lacing loops 52, 54. The resulting arrangement is generally as shown in FIGURE 2 except that the knots replace

the mechanical holding device 56 shown in FIGURE 2. The loops are then threaded through the bottom of the clasp receptacle, also known herein as the clasp body, with the loops exiting the clasp body in a generally outwardly-directed orientation.

With the loops threaded through the clasp receptacle/body, the clasp cover is aligned with the clasp receptacle/body and the cover and body are snapped together. The cover/receptacle combination is at that point permanently installed on the shoe, unless the user intentionally chooses to forcefully disassemble the clasp from the shoe.

The user can then grab the overhanging edges of the cover and lift the cover to thereby move the clasp to the open position, whereupon the lacing elements pass freely through the clasp so the user can loosen the lacings on the shoe and remove the shoe from the foot. Such lifting, and the associated loosening, are illustrated in FIGURE 20.

Similarly, the user can pull the lacing loops upwardly and outwardly away from each other to tighten the lacing elements on the shoe, and about the foot of the user. While holding the lacing elements tightened, the user pushes down on the cover as illustrated in FIGURE 21, causing the clasp to move to the closed position wherein the gripping surfaces of the cover and receptacle are brought into facing, and gripping, relationship with the lacing elements, whereby the lacing elements are held securely in the clasp. Namely, the outside surface of left side wall 302 of the cover comes into gripping engagement with lacing element 52 and the inside surface of left side wall 390 of the receptacle; and the outside surface of right side wall 304 of the cover comes into gripping engagement with lacing element 54 and the inside surface of right side wall 392 of the receptacle.

When it is desired to again loosen the lacings on the shoe, the user grasps the overhanging edges of cover 382 and lifts the cover away from the receptacle 380, whereupon the lacing elements are again free to slide through the clasp.

While it is stated hereinabove that the cover slides freely up and down with respect to the receptacle, with male latches 393 sliding up and down in slots 381 of female latch 398, such recitation is made within the context of the clasp only, not in the environment which includes a lacing in the clasp. Accordingly, when a correspondingly-sized lacing is included in the clasp, such statement "slides freely" is tempered by the resistance which accompanies the interfacing, and interference, between the clasp and the lacing. Thus, when the cover is relatively elevated with respect to the receptacle, the "sliding" is in general free from lacing-based interface restrictions. However, when the cover is in a relatively down position with respect to the receptacle, the lacing establishes substantial resistance between itself and both the cover and the receptacle. Correspondingly, the

interference between the lacing, and the cover and receptacle, overrides the otherwise free sliding nature of the cover and receptacle with respect to each other, whereby the interference between the lacing, and the cover and receptacle, becomes the controlling interaction in the clasp, such that the cover and receptacle are prevented from free sliding with respect to each other, and the facing side walls 302 and 390, and 304 and 392, work together as effective gripping structures such that the lacing is held fixedly in the clasp, until such time as the clasp is opened thus to release the lacing for further longitudinal movement through the clasp.

When it is desired to loosen the lacing on the shoe, the user grasps top panel 383, and/or optionally grasping ribs 385 of the cover, and lifts the cover away from the receptacle, thus releasing the lacing loops from the compression between side walls 302 and 390, and between side walls 304 and 392. Lacing loops 52, 54 are then free to move longitudinally with respect to the clasp, namely in and out of the clasp. If the end 116 of a loop 52, 54 approaches a side wall of the receptacle as the loop is being pulled back through the clasp, the loop end becomes engaged by the respective grasping rib 385. Even if the loop gets past grasping rib 385, or if optional rib 385 is omitted from the structure of cover 382, the respective lacing loop 52, 54 is caught by separator 397, as the clearance between separator 397 and channel 391 is sufficiently small that the lacing loop end cannot get through the space between separator 397 and channel 391. Accordingly, the risk of losing the clasp is substantially eliminated.

For use with conventional round shoe laces as are ubiquitously available on shoes in the US, the clearance between the outer surface of side wall 302 of the cover, and the inner surface of side wall 390 of the receptacle, with the clasp closed, is about 2 mm (0.08 inch). The specific desired clearance, indeed the cross-sections of recesses 387, are selected depending on the cross-section and compressibility of the lacing to be used with the clasp. As a corollary, the lacing can be selected to facilitate use of a clasp having pre-determined cross-section configurations at recesses 387.

While the clasps of the invention have been described herein in terms of their functioning elements, in terms of the structure which enables the recited functions, the description here is not limiting as to additional elements which can be added to the clasp in order to enhance its aesthetic appeal, or to enhance its ease of use.

For example, the cover, e.g. 282, 382 can have downward-depending front and rear panels which extend down over the front and back walls of the receptacle. For example larger gripping surfaces or gripping elements can be provided attached to the cover to enhance ease of gripping the cover such as to facilitate use by people who have

limited grip capability. For example, a variety of decorative structures can be added to either the receptacle or the cover to enhance the appearance of the clasp. Indeed, a wide variety of decorative and graphic structures and appearances, and appearance types, which are known for use in the shoe art, and/or in the lacing art, can be adapted to the clasp. Thus, there can be mentioned various colorings, designs, lights, transmitters, receivers, cavities, pockets, and the like, any of which can be appended to the clasp, either alone or in combination.

Any of the embodiments of the invention can be embodied in a lacing kit of one or more lacing elements in combination with a clasp. Such lacing kit can be employed to provide lacing on a shoe having suitable eyelets, either as original lacing equipment on the shoe, or as replacement lacing on a shoe which was previously fitted with other lacing.

The invention can be used with eyelets which are arranged in any suitable manner on the shoe body. The eyelets which are illustrated are shown to pass the lacing elements front to back through the eyelets. Other known conventional, and acceptable, eyelet arrangements pass the lacing elements between the inner surface of the shoe body and the outer surface of the shoe body.

The eyelets can be made of any material otherwise suitable for the eyelets of a shoe.

The lacings and lacing elements can be any lacing or lacing element otherwise suitable for lacing a shoe so long as the lacing elements and the clasp are suitable sized and configured as to cooperate with each other.

As used herein, "lacing" refers to the collective elongate structure which is threaded through, or otherwise wound or attached to lacing eyelets which are built into a shoe.

As used herein, the phrase "lacing element" refers to one or more elements of a lacing. Thus, a lacing can extend through eyelets on both sides of the expansion opening as first and second lacing elements. In such case, the lacing typically crosses between sides of the expansion opening at or adjacent the proximal end of the expansion opening which is closer to the toe of the shoe, and the lacing ends extend from the eyelets at or adjacent the distal end of the expansion opening.

Still further, the lacing can be comprised of first and second separate and distinct lacing elements, each separately attached to the shoe body. In such case, the respective lacing elements are typically fixedly attached to the shoe at or adjacent the proximal end

of the expansion opening. Such attachment can be permanent or temporary. Preferably, the attachment is temporary, thus accommodating the installation of new lacing elements if and when a given lacing element wears out.

In the alternative, the lacing can extend through eyelets on both sides of the expansion opening as first and second lacing elements, and the lacing ends terminate e.g. on both sides of the expansion opening at or adjacent the proximal end of the expansion opening. The ends of the lacing element are secured to the shoe, e.g. either at the shoe body or at an eyelet or eyelet loop, at or adjacent the proximal end of the expansion opening. In such case, the lacing crosses between sides of the expansion opening at or adjacent the distal end of the expansion opening. Such lacing arrangement is illustrated in FIGURE 2A. As shown in FIGURE 2A, lacing ends 48, 50 are secured to eyelet loops 36 by knots 77, and the lacing crosses between sides 14, 16 of the shoe at lax lacing strand 118.

In light of the above description, it is clear that the invention can be practiced with a variety of clasp structures, and with a wide variety of conventionally-available lacings.

Accordingly, the invention basically comprehends anchoring the lacing ends to the shoe body, forming lacing elements 44, 46 into first and second lacing loops 52, 54 at or adjacent the distal end of the expansion opening, on opposing sides of the shoe, threading the lacing loops through a suitable clasp, pulling the lacing loop ends away from each other thereby to tighten the lacings on the shoe, and bringing the lacing elements into gripping engagement with gripping elements of the clasp while the lacings are being held tight on the shoe body, whereby the gripping elements of the clasp temporarily grip and hold the lacing loops against release of the tightness so achieved.

Those skilled in the art will now see that certain modifications can be made to the apparatus and methods herein disclosed with respect to the illustrated embodiments, without departing from the spirit of the instant invention. And while the invention has been described above with respect to the preferred embodiments, it will be understood that the invention is adapted to numerous rearrangements, modifications, and alterations, and all such arrangements, modifications, and alterations are intended to be within the scope of the appended claims.

To the extent the following claims use means plus function language, it is not meant to include there, or in the instant specification, anything not structurally equivalent to what is shown in the embodiments disclosed in the specification.